close to the stem, the projecting stump decays, and the decay affects the trunk. Where branches are not pruned at all, or not at the right time, natural pruning caused by thick planting occurs, but the decay of the branches also affects the trunk. Too early thinning prevents the growth of clean boles with suppressed branches. All these points require careful attention in forestry, or considerable depreciation in the value of the timber ensues. The Royal Agricultural Society, the Royal Agricultural College, the Surveyors' Institution, and Mr. A. T. Gillanders (forester to the Duke of Northumberland) sent collections of mounted specimens of insects injurious to forest trees. Those of Mr. Gillanders were very complete, and were classified as beetles, saw-flies, moths, scale insects, aphidæ, and diptera.

Nature-study in Rural Schools.

This, a new feature, was by no means the least interesting department of this year's exhibition. It was organised by the County Councils Association, and was divided into groups of exhibits from public elementary schools, secondary schools, and school gardens. The counties from which exhibits were sent included Cambridge, Cumberland, Durham, Derby, Essex, Leicester, Lincoln, Nottingham, Stafford, Suffolk, Sussex, and Worcester, and the work sent was highly creditable to both teachers and scholars. It was stated that the specimens were collected and mounted by pupils of average intelligence, but the excellence of many of the water-colour drawings of common flowers was remarkable. The collections made by the scholars included mounted specimens of local flowering plants, some of them classified into hedge-row, wood, and water plants, collections of tree leaves, autumn fruits, fossils, common insects, snails, wireworms, &c. In the secondary schools the work was, of course, more advanced, and included classification into seeds, seedlings, branches, flowers, fruits, and wood in the case of common trees. The Staffordshire County Council exhibited collections of tools, seeds, and apparatus as supplied to school gardens, and a map showing that gardening classes are held in seventy-nine day schools, in thirty evening schools, and two grammar schools in that county. The introduction of nature-study into our rural schools appears to hold out great promise as a means of training and developing the intelligence of country children. It should go far to counteract that "dulness of the country" which is stated to be one of the potent causes of migration to the towns. Education of the youthful mind to the intelligent appreciation of natural phenomena may be regarded as a most important means of ensuring the future progress of agricultural science. E. H. G.

RUSSIAN GEOGRAPHICAL WORKS.

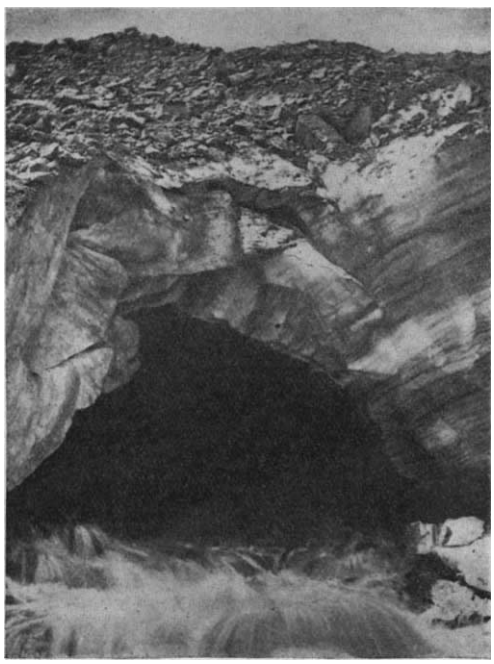
SEVERAL papers and memoirs of scientific interest and importance are included in publications received from Russia during the past few months. The publications are printed in the Russian language, and among them are four volumes of the Proceedings of the Imperial Russian Geographical Society.

In vol. xli., part iv., of the Proceedings of this society, Mr. V. V. Markovitch contributes lengthy articles, one entitled "In Search of Eternal Ice," and the other on the ice-fields of the Caucasus, illustrated with beautiful photographs and sketches. Botanists will be interested in his notes on the flora of the mountains. Elaborate reports on the subject of ground ice, by a commission appointed to study the question, appear in the Proceedings, vol. xli., part ii. A map of European Russia is given, indicating results of investigations by many observers. In vol. xl., part iv., an important examination by Mr. A. I. Voieikoff of the question whether the Pacific Ocean will become the chief commercial route of the terrestrial globe appears, with statistics and maps.

In vol. xli., part iii., Mr. L. Berg differs from Prince P. Kropotkin's opinions on progressive desiccation of Eur-Asia, maintaining that the climatic conditions of Central Asia have been practically unchanged from the earliest recorded times, and that geological desiccation has long ceased. Mr. Berg refers to a canal called after Hammurabi (Amraphel, King of Shinar), a passage in the "Song of Songs" about the cessation of winter and stoppage of rains, a plant crowning the mummy of an Egyptian princess, Quintus Curtius's account of Bactria in the time of Alexander, down to the investigations of Heim, Hess, Bruckner, and Russian explorers. The writer adduces his experiences of the Aral region in support of his conclusions.

In 1896, 1897, and 1899 Mr. N. A. Busch was commissioned by the Imperial Russian Geographical Society to investigate the glaciers of the western Caucasus, Kuban district, and Sukhum circle. The results are recorded in his report, "Glaciers of the Western Caucasus," 1905 (134 pages), which is furnished with a helpful index and some fine views.

A work entitled "Materials for the Geography of the Urals," by Mr. P. Krotov, describes orohydrographical investigations in the southern part of the central Ural range. The preface opens with a reference to Dr. Carl Hiekisch's work "Das System des Urals" (Dorpat, 1882), to show that knowledge of the geography of these regions is meagre and superficial owing to lack of expenditure of money and exertion. It is claimed that the northern and



Ice-cave of the right glacier of the Tsherin-kol.

southern parts of the range are more familiar to scientific explorers than the more accessible central part. In 1893 it was decided to make an orohydrographical survey of portions of the Ekaterinburg and Krasnoufimsky districts, Perm government, but the area proposed was afterwards limited. Mr. Krotoff reviews previous explorations, mentioning, *inter alia*, the labours of Tatistsheff, Humboldt, and Murchison.

The six chapters contain:—historical sketch of previous explorations; cartographical materials and geological sketch; orographical description; hypsometry of the western slope of the Urals; hydrographical description; concluding notes; "absolute heights" in the southern part of the central Urals; forty-two pages of lists of heights. Orographical and geological charts are given at the end on a scale of five *versts* to the inch.

The report of the Imperial Russian Geographical Society for the year 1904 contains a vast amount of useful matter, especially in the records of scientific exploration. Following the official lists there are short biographies of deceased members, including General P. S. Vannovsky and Admiral S. O. Makaroff, medallist, constructor of the ice-breaker *Yermak*.

The society regrets that owing to unavoidable hindrances many undertakings had to be abandoned. About six pages are devoted to the exploration conducted by Mr. A. V. Zhuravsky of the Bolshezemelsky tundra, starting from the Petshora, and including the river Adzva, the Vashutkin lakes, and the Adak ridge. Samoyed natives assisted as guides. As a result, some important local points were made clear, collections of flora and water fauna, molluscs, and spiders were made, besides a herbarium, map of the lakes and rivers, photographs, meteorological report, and statistics of the native population—which is in danger of dying out—were collected. In the Proceedings of the society, vol. xli., part iii., 1905, Mr. A. Rudneff contributes a preliminary report of this expedition, with illustrations. This region has only been traversed twice previously, by Mr. William Gourdon, of Hull (1614–1615), who left a diary, and by Herr A. Schrenk (1837), author of an account of travel in north-eastern European Russia. Mr. A. V. Zhuravsky's letter to the secretary, in which he relates his activities and mentions the establishment of a zoological station at Ustzilma, appears in vol. xli., part iv.

Mr. A. A. Makarenko made an ethnographical expedition to the Yenesei government, and collected songs and information on local medicine. Other important explorations in Turkestan and the southern steppes are reported. Condensed reports of the ethnographical and other sections, financial statements, publications issued and received, and miscellaneous notes complete the volume.

The Russians have accumulated a vast amount of material with regard to the customs and literature of the Turks and Tartars, the results of researches in fields practically inaccessible to Western scholars.

"The Story of Yedigei and Toktamysh," edited by Prof. P. M. Melioransky, consists of a preface, glossary, and nearly forty pages of Kirghiz text (in Arabic characters) of an old tradition concerning some of the leading members of the famous Golden Horde, *temp.* later fourteenth and earlier fifteenth century. Khan Toktamysh, after the defeat of the Khan Mamai at Kulikovo-polie by the Grand Duke Dmitri Donskoi, in the following year attacked and burned Moscow. Yedigei was a specially distinguished emir under Toktamysh, and, according to the story, was the son of a holy man, Hodzha Amet, and a mysterious, aqueous being with a goat's feet and a transparent body, upon whom her husband does not gaze when she removes a garment for fear she should wish to leave him. Timour or Tamerlane, styled in the story *Sa*[1] *Temiru*, revered the memory of the Hodzha and protected his son. From being a follower of Toktamysh, Yedigei induces Timour to make war on him, and is credited with a similar judgment to that of Solomon in a parallel case of maternal controversy.

The tradition exists among the Nogai, Kirghiz, and Siberian Tartars in varied form. We are not in a position to criticise the text of the poem, and the learned editor hints at a vast wealth of Tartar tradition still to be collected and arranged for publication.

THE MATTEUCCI MEDAL.

THE Italian Society of Sciences known as the Society of the Forty has awarded the Matteucci medal for 1906 to Sir James Dewar in recognition of his scientific work. In presenting the report upon the award, the committee of the society, consisting of Profs. P. Blaserna, A. Righi, and A. Roiti, referred to Sir James Dewar's researches in the following terms:—

James Dewar, born in 1842 at Kincardine-on-Forth in Scotland, completed his studies and took the first steps in his professorial career in the University of Edinburgh; in 1873 he was appointed professor of natural philosophy at Cambridge, from which post he was promoted Fullerian professor in the Royal Institution in London, where he is likewise director of the laboratory founded in memory of Davy and Faraday.

We shall not pause to enumerate all the contributions which he rendered to the knowledge of aromatic compounds, nor the other important investigations in chemistry by which he initiated his scientific career. But we cannot omit to point out the work which he carried out from 1878 to 1890, for the most part in conjunction with Prof. G. D. Liveing, of Cambridge, which work undoubtedly forms part of the finest that has yet been produced in the field of spectrometry. This work is set out in about fifty short notices free from all preconceived ideas and admirable in their experimental genius, enriched with data meriting the highest attention and universally accepted, and fertile in their theoretic bearing and scope. Dewar and Liveing were the first to investigate the phenomena of inversion in many elements; afterwards they studied the influence of temperature on the spectra of the same elements, and the way in which these spectra were modified by the presence of other elements. Extremely interesting are their researches regarding the various spectra of carbon and its compounds, and in relation to the phenomena of synthesis manifested in the electric arc. They, moreover, furnished the first exact determinations of the ultra-violet spectral region, assigning with the utmost care the wave-lengths for a fair number of elements.

Various other problems made evident Dewar's extraordinary experimental ability, and his world-wide fame was secured by the problem, more than any other, of obtaining extremely low temperatures, to which he has indefatigably and courageously devoted himself for more than twenty years, with the satisfaction of seeing his labours crowned by the liquefaction and solidification of hydrogen, which allowed him to study the chemical and physical properties of gases formerly held to be irreducible, when they have changed their state of aggregation.

Having ingeniously contrived means for rendering inconsiderable the losses by evaporation of these new and highly volatile liquids, and thus for preserving them for a length of time in large quantities, he turned this to able account in order to investigate the very varied phenomena which took place at their boiling temperatures, low in themselves, and still further lowered by expansion.

Most extensive is the field covered by Dewar in his studies of this kind: variations of density and cohesion, chemical and photographic actions, phosphorescence and radio-activity, optical properties, thermoelectricity, electric conductivity and inductivity, and magnetic susceptibility. It would take too long to enumerate here the important and partly unexpected results obtained by him, and indeed it is superfluous, as they are present in the minds of all. Let us rather restrict ourselves to accompanying the Matteucci medal, which we award him, by the wish that from the 13°, which he has already reached, he may descend still further downwards towards absolute zero, and succeed in liquefying even helium.

[1] *Sa*, it is explained, is a form of the word *Tsar* (Cæsar).

PRACTICAL METEOROLOGY.

THE Meteorological Committee has issued its first report, for the year ended March 31, 1906. In compliance with the desire expressed by H.M. Treasury, the work of the office proceeds generally on the lines hitherto followed, and the committee record "their appreciation of the services rendered in the administration of the office by Sir R. Strachey, the chairman of the council for twenty-two years," and by other members. An important addition has been made by participation in the investigation of the upper air by means of kites. It is also proposed, if practicable, to make use of unmanned balloons, and to render the service more effective by cooperating with the representatives of other bodies concerned in the work. Among some of the useful researches initiated or completed during the past year may be mentioned (1) the study of the trajectories of air in travelling storms, embodied in an official publication entitled "The Life-history of Surface Air Currents"; (2) re-determination of the velocity equivalents of the Beaufort scale of wind force; (3) connection between the yield of wheat in eastern England and the rainfall of the previous autumn; and (4) possible relationship between exceptional strength of the south-east trade wind at St. Helena and exceptional rainfall in England. Reference to these investigations has already been made in our columns. We note that the payment hitherto made to Dr. Buchan, as inspector of stations in Scotland, is to